Research Institute of Agricultural Economics
Committee on Agricultural Economics, Hungarian Academy of Sciences

STUDIES IN AGRICULTURAL ECONOMICS
No. 113

Budapest
2011

Studies in Agricultural Economics No. 113

The Studies in Agricultural Economics is a scientific journal published by the Hungarian Academy of Sciences and the Research Institute of Agricultural Economics, Budapest. Papers of agricultural economics interpreted in a broad sense covering all fields of the subject including econometric, policy, marketing, financial, social, rural development and environmental aspects as well are published, subsequent to peer review and approval by the Editorial Board.

Manuscripts should be sent via e-mail to the Editor-in-chief (aki@aki.gov.hu). Instructions for the authors can be found on the website of the Research Institute of Agricultural Economics: http://www.aki.gov.hu

HU ISSN 1418 2106

1463 Budapest, POB. 944. Hungary

How does it work for Hungarian food consumers? A medium-term analysis

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Abstract

The accession of Hungary to the European Union (EU) in 2004 was expected to lead to price convergence to the EU levels. The influence of national and EU policies on Hungarian producers and consumers is important as they were facing a new situation. Consumers' welfare depends on the constantly altering world- and common market, and political actions. The purpose of this study is to analyse welfare changes and distributional impacts on Hungarian food consumers. The paper focuses on Laspeyres index, compensating variation and elasticities of demand.

Keywords

Food consumption, consumer welfare, compensating variation, price change, elasticity

Introduction

Ten countries joined the European Union in 2004. The accession means economic and political challenges for Hungary to achieve economic convergence as well as the adoption of the single currency. Hungary was to come under the Common Agricultural Policy (CAP) farm support programme. On the basis of the CAP, crop and dairy producers were forecast to benefit from the programme, while fruit, vegetable, poultry and pork producers were expected to face more competitive markets and receive less financial support. Rising feed grain prices were forecast to cause higher costs for pig and poultry farmers. Changes in producer prices lead to changes in consumer prices (Clark, 1995). As increased price uncertainty reduces consumer welfare, a survey of food consumption and the food market is of great interest (Lőrincz et al, 1999).

The effects of economic policies and reforms on consumer welfare can be evaluated by welfare economics. Welfare economics formulates the economic and political recommendations that are sufficient for maximising welfare. The concept of welfare economics was set up by Pareto (1897) and Pigou (1920), and broadenied by Arrow and Debreu (1954) due to their research in the field of general equilibrium. One measure of welfare is the consumption-based measure that is a comprehensive indicator for poverty assessments (Demery, 1993, Appleton, 1996). Instead of a total consumption-based welfare measure, a food consumption-based measure is claimed to be superior (Anand and Harris, 1990). There are three central methodologies of welfare in economics: consumer surplus (CS), compensating variation (CV) and equivalent variation (EV). Willig (1976) showed that the differences between the three measures are small for small price changes regardless of the elasticities. Thus, the three measures of welfare give very similar answers even for aggregate goods.

Indifference curves are also to analyse the welfare effect of an increase in price. An alternative welfare indicator is the food share. According to Engel's law if the consumer's income rises, the proportion of income spent on food falls, i.e. food shares should decrease with income (Appleton, 1996).

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Compensating variation is a measure of utility change introduced by John Hicks (1939). It can be used to calculate the effect of a price change on individuals' welfare. It refers to the amount of additional money that a consumer would need to reach his/her initial utility after a change in prices. Compensating variation can be used to find the effect of a price change on consumer's net welfare. Tiezzi (2005) calculated the welfare effects and the distributive impacts on Italian households after the Italian Carbon Tax had been introduced. True Cost of Living index was used to determine the compensating variation. The conclusion was that all welfare changes were positive due to the reform, representing losses to households rather than gains. The welfare loss increased with income for each household profile.

A more sophisticated method of measuring welfare effects is Laspeyres index. This is a price index that was developed to measure changes in the cost of living and to determine the amount of additional wage to maintain the consumer's constant welfare. It defines a basket of goods in a base period, and uses recent prices for the selected goods to examine changes over time. It reflects new prices and old utility level.

Hubbard and Thomson (2007) studied the short-term welfare effects on Romanian food consumers after Romania's accession to the EU. They distributed the Romanian households by socio-economic category and by area. On the basis of the Laspeyres index and initial income, the CV was computed for each type of household. They found that rural households require a higher increase in their initial income compared to urban households to be able to consume the same bundle of goods as before. Within the socio-economic categories they observed that rural farmer households were the most affected, while urban employer households were the least affected due to the accession. Hubbard and Podruzsik (2006) conducted similar research to study the welfare changes of Hungarian food consumers after EU accession. They concluded that in the short term the accession had a negative impact on all consumer groups and that the poorest households needed a 2 per cent increase in their net income to maintain their welfare.

The aim of this study is two-fold. Firstly, a possible Hungarian food basket is defined. The study by Ferenczi et al. (2002) forecast slight or negligible increase in Hungarian food prices due to the EU accession as food products are non-tradable goods. Price changes of the concerned food products after the accession are demonstrated between 2003 and 2009. Secondly, the changes in consumers' welfare and market attitude are calculated using a pre-accession year (2003) and the post-accession years (2004-2008) to compare the two periods. Consumer welfare is analysed by the Laspeyres index. Our intention is to point out the additional cost burden on consumers if they want to consume the same bundle of goods as before the price changes. Consumer welfare effects are measured by the compensating variation which reflects the additional amount of money that a household would need in order to reach its initial utility.

Laspeyres index and CV considers only the price change of the given food basket. To analyse the response rate of demand by the consumer it is important to know how the share of different products changed in the food basket due to price and income changes. In order to receive information about changes of market share of the food products, own, cross and income price elasticities are calculated as appropriate.

Database and methods

In our study the food consumption of Hungarian consumers is assumed to be the indicator of welfare. Food consumers are divided into ten deciles according to their income. Households from the first decile earn the least while decile 10 has the highest standard of living. Three types of data are analysed; two of them are in connection with food consumption: quantity demanded (q) and monthly price of the concerned food products (p). The following products were chosen to represent the food basket of Hungarian food consumers: rice, bread, wheat flour, potatoes, sugar, sunflower oil, pork, poultry, beef, milk, margarine, cheese, eggs, onions, apples and oranges. These products are basic in the Hungarian diet. In addition to these raw or processed food products, many others could have been chosen but the price or consumption data were limited or insufficient for the secondary analysis. The third data set that is used for the calculations refers to the consumers' income (I) in HUF. For the income elasticity calculations, yearly disposable income data per consumer deciles is utilised.

The consumption data were derived from the Household Budget Survey, collected by the Hungarian Central Statistical Office (HCSO). HCSO regularly conducts this extensive household consumption survey in which The households are representative of the population. HCSO surveys cover the entire geographic range of Hungary and contain detailed consumption data on a total of 960 food and non-food goods.

Recent income and price data were also supplied by the HCSO. The data contain yearly average price observations for 19 counties throughout the country. The year 2003 is the first survey before the onset of the EU accession, while year 2009 is the most recent one. In order to eliminate the effect of inflation, an index value is used as a deflator. Instead of Consumer Price Index (CPI), which reflects the prices of a representative basket of goods and services, the GDP deflator is chosen for the calculations, as it refers to prices of all goods and services produced in the country. The value of the GDP deflator between 2003 and 2009 (where 2003=100%) originates from the Economic Statistics Database. Prices of the chosen food products were deflated as from the year 2004. It is assumed that prices of all other goods remain constant during the examined period and that total income equals total expenditure (no net savings). Differences in tastes of households and quality of food products are assumed to be negligible.

To estimate results for the medium-term impact of the accession, the Laspeyres index is calculated. It gives the changes in the cost of living for each consumer decile as a result of changes in food prices due to the accession, *ceteris paribus*. Laspeyres index can be calculated using the following formula:

$$L_I = \frac{\sum_{i=1}^{n} q_{i_0} * p_{i_1}}{\sum_{i=1}^{n} q_{i_0} * p_{i_0}} * 100 \qquad (1)$$

where:

q_{i_0} = purchased quantity of item i in the base period

p_{i_0} = price of product i in the base period

p_{i_1} = price of product i in period t

If $L_I > 1$, consumer welfare loss, if $L_I < 1$, consumer welfare gain can be recognised.

Firici developed the model in 2003 considering non-food expenditure to be constant. In this study the method of Firici is adopted. With the support of the Laspeyres index Slutsky Compensating Variation is counted using the following formula.

$$CV = I_{total} * (L_i - 1) \quad (2)$$

where:

I_{total} = total disposable income, monthly average

Laspeyres index measures the change in cost of purchasing for the same food basket in the base and the current period but quantities do not need to be calculated. Income effect from the formula is also extracted. In order to measure changes of the quantity consumed due to a price and income change, own, cross and income price elasticities are estimated. For the calculations the formulae devised by Marshall (1890) are utilised.

$$\varepsilon_{own} = \frac{\Delta q_a / q_a}{\Delta p_a / p_a} \qquad \varepsilon_{cross} = \frac{\Delta q_a / q_a}{\Delta p_b / p_b} \qquad \varepsilon_{income} = \frac{\Delta q_a / q_a}{\Delta I / I_0} \quad (3), (4), (5)$$

where:

q_a = demand quantity of product a
Δq_a = change in demand of product a
p_a, p_b = price of product a, b
Δp_b = change in price of product a, b
ΔI = change in disposable income of consumer
I_0 = income of consumer in the base year

Results and discussion

After deflation of the food products prices, the price changes and trends between 2003 and 2009 are shown in Table 1. The figures in Table 1 show the increasing price tendency among meat products and most of the cereals (except vegetable oil). Some of the animal products (cheese, milk) and fruit and vegetable (potatoes, onions) decreased; however the tendency among other products is to increase.

The estimated results for the medium-term impact of the EU accession are indicated in Table 2. Laspeyres indices give the changes in cost of living for each decile as a result of changes in food prices due to the accession, *ceteris paribus*. Laspeyres index exceeded 100 per cent for all consumer deciles in the examined years except in 2005. The increasing food prices mean a negative impact on overall consumer welfare. The low values in 2005 might be a reflection of the price fall indicated in Table 1.

Table 1

Real price changes in Hungary of some food products between 2003 and 2009

Product		2004/2003	2005/2003	2006/2003	2007/2003	2008/2003	2009/2003	Trend
		2003=100%						
Livestock	Pork	8.8	11.6	16.6	7.8	15.6	18.4	↑
	Beef	3.2	8.8	14.4	17.6	17.9	23.3	↑
	Poultry	4.7	5.7	4.9	15.3	25.2	25.6	↑
Animal prod.	Eggs	5.9	-1.3	4.3	16.5	29.4	28.8	↑
	Milk	-4.8	-8.6	-5.4	-0.5	12.2	-0.8	↓
	Cheese	5.2	-16.1	-16.7	-11.7	-3.9	-24.6	↓
	Margarine	3.6	4.9	6.1	10.3	28.7	38.6	↑
Crops/ cereals	Flour	15.2	-11.3	-8.7	19.6	48.4	31.2	↑
	Rice	3.3	-1.7	-3.4	7.0	36.4	57.4	↑
	Bread	9.3	4.0	3.4	17.3	28.7	21.9	↑
	Sugar	11.8	3.7	8.6	8.3	-4.8	-5.7	↑
	Vegetable oil	-6.2	-15.2	-15.3	-8.3	42.5	16.7	↓
Fruitveg	Potatoes	-6.0	-45.4	-7.3	24.8	-14.1	-15.7	↓
	Onions	-11.3	-41.0	-11.9	7.8	-10.8	-17.0	↓
	Apples	-8.7	-10.0	5.8	27.4	52.3	2.8	↑
	Oranges	5.4	-2.8	-1.9	-1.0	1.8	0.3	↑

Source: authors' calculations according to HCSO (2003-2009) food price data

Table 2

Laspeyres indices per deciles

Year	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
2004	100.9	100.6	100.6	100.5	100.4	100.5	100.4	100.3	100.3	100.2
2005	99.7	99.6	99.6	99.6	99.6	99.7	99.7	99.7	99.7	99.8
2006	100.6	100.4	100.4	100.3	100.2	100.3	100.2	100.2	100.1	100.1
2007	102.1	101.6	101.4	101.3	101.1	101.1	101.0	100.8	100.7	100.4
2008	104.0	102.9	102.7	102.5	102.1	102.1	102.0	101.6	101.4	100.9
2009	102.9	102.0	101.9	101.7	101.3	101.4	101.3	101.0	100.9	100.5

Source: authors' calculations according to HCSO, 2010

The results of the CV calculation are summarised in Table 3, which shows the monthly CV values in HUF that a person from each decile should receive to remain at the same welfare as before the food prices changed. The average amount of the compensation varies between 182 and 233 HUF in 2004 while it is three times higher in 2009 for all household profiles. The results correspond with Tiezzi's findings (2005) that welfare loss increased with income for each income group. The highest compensation should be added to D6 and D7 in order to remain as well off as in 2003.

Table 3

Compensating variation per deciles

Year	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
2004	182	195	205	218	201	233	219	221	215	213
2005	-63	-119	-151	-160	-186	-151	-190	-188	-224	-228
2006	119	124	130	144	108	154	120	113	87	63
2007	446	481	532	555	528	558	563	524	534	488
2008	834	893	989	1,034	1,027	1,086	1,123	1,062	1,097	1,071
2009	600	621	684	710	661	731	721	677	684	624

Source: authors' calculations according to HCSO, 2010

However it does not mean that these two deciles are the most vulnerable due to the accession. In Table 4 the per cent of initial income is indicated that should be added to a consumer as compensation. According to the results, the low income groups are the most vulnerable. D1 suffered from notable losses over the years. In 2008 a four per cent increase in disposable income was necessary to maintain their initial welfare. It is only 0.1-1.6 per cent for the richest income groups, even the compensating amount in HUF is higher for D10 than for D1. The reason for the situation is that food expenditure represents a greater share of total income for poorer households, meaning higher compensation to be added to them.

Table 4

Compensation per initial income, %

Year	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
2004	0.9	0.6	0.6	0.5	0.4	0.5	0.4	0.3	0.3	0.2
2005	-0.3	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3	-0.3	-0.3	-0.2
2006	0.6	0.4	0.4	0.3	0.2	0.3	0.2	0.2	0.1	0.1
2007	2.1	1.6	1.4	1.3	1.1	1.1	1.0	0.8	0.7	0.4
2008	4.0	2.9	2.7	2.5	2.1	2.1	2.0	1.6	1.4	0.9
2009	2.9	2.0	1.9	1.7	1.3	1.4	1.3	1.0	0.9	0.5

Source: authors' calculations according to HCSO, 2010

In Table 5 the food share of Hungarian consumers is shown. The data highlight the proportion of expenditure on food products in the total income comparing the years 2003 and 2007. It is obvious that Engel's law is valid for Hungarian food consumers. Food share is the highest in D1 and the lowest in D10. Although it has decreased from 2003 the food share is still high for the lowest income groups compared to the EU average.

Table 5

Percentage of food expenditure in Hungary in 2003 and 2007

Year	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
2003	33.3	30.9	30.4	29.5	27.7	28.1	26.2	24.9	23.0	18.1
2007	30.9	24.3	21.8	20.2	19.3	19.0	18.5	16.5	15.3	10.9

Source: authors' calculations according to HCSO, 2009

According to Tables 2, 3 and 4, D1 of the Hungarian food consumers was the most vulnerable consumer group in 2008 due to the price change of the given food basket, while the highest amount in monetary terms should have been added to groups 6 and 7.

After studying the changes of quantity demanded as a result of price and income changes for these deciles the price and income elasticities are summarized in Table 6, 7 and 8. For D1 the own-price elasticities of demand are on the diagonal of Table 6. Except for cheese and onions the elasticities are negative. The price elasticity of demand is positive for cheese and onions meaning that they behaved as Giffen goods. From these products the quantity demanded went up despite the fact their prices also went up. As HCSO treated cheese as a single product in 2003, it became aggregated with quark until 2008, meaning that the elasticity calculation is distorted and cheese could have been omitted from the sample. The highest values are for oranges, beef and sugar. In the case of a price increase of one per cent, the quantities would be reduced by 2.20, 0.65 and 0.63 per cent.

The cross-price elasticities are also indicated in Table 6. Cross-price elasticities may show complementary or substitute relationships between the different food groups. For example the price of cheese rose, D1 reduced their consumption of all other goods except onions. The cross-price elasticity is positive when the two goods are substitutes. However for D1, all cross-price elasticies except cheese and onion are negative, meaning that household do not substitute good *a* with good *b*.

The elasticity values for D1 and D7 are different. In general higher elasticities are observed for poor households and lower elasticities are found for richer households. Estimates of the own price elasticities for D7 are on the diagonal of Table 7. Except cheese and onions the elasticities are negative in this case as well. The highest values can be observed for potatoes, oranges, apples and bread. If the price increases by one per cent, the quantities of potatoes and citrus fruits would be reduced by 2.45 and 1.94 percent respectively while a one per cent increase in apple and bread prices leads to a reduction of quantities by 0.38 and 0.36 per cent. Cheese elasticity is useless, onions behaved as Giffen goods in D7, as well. The own price elasticities of the other goods are low. In the case of beef meat perfectly inelastic demand is noticeable. The quantity demanded was not affected by the price change that occurred over five years, it was consequently 1.3 kg/capita both in 2003 and 2008 for D7.

The cross price elasticity of demand is negative when the two goods are complementary. As the price of margarine rose, D7 reduced their consumption of bread, sugar and vegetable oil. At the same time they increase their demand for pork meat by 0.07 and 0.06 per cent when the price of poultry or beef meat increases, behaving as substitute products. The cross price elasticity of demand is zero for beef meat. The price changes of the other goods caused no change in demand for beef meat (1.3 kg/capita).

Income elasticity reflects changes in demand for a good due to a change in the income of the people. Income elasticities are calculated for the poorest (D1) and the richest (D10) income groups and for the middle class (D6). Increases in income caused higher onion consumption for D1 and D10. D6 decreased their onion consumption. In Table 8 negative income elasticity for almost all food groups is noticeable. Negative income elasticity means that the increase in income was not followed by the increase of demand. The analysed food products behave as inferior goods instead of normal goods.

Table 6

Own and cross price elasticities in 2008/2003 for Decile 1.

q \ p	Pork	Beef	Poultry	Bread	Sugar	Veg. Oil	Marg	Milk	Eggs	Cheese	Potatoes	Apple	Orange	Onion
Pork	**-0.23**	-0.21	-0.18	-0.16	-0.58	-0.13	-0.16	-0.25	-0.16	-0.54	-1.92	-0.11	-0.39	-1.05
Beef	-0.70	**-0.65**	-0.54	-0.50	-1.77	-0.39	-0.50	-0.77	-0.49	-1.65	-5.89	-0.33	-1.18	-3.21
Poultry	-0.53	-0.50	**-0.41**	-0.38	-1.35	-0.29	-0.38	-0.59	-0.38	-1.26	-4.48	-0.25	-0.90	-2.45
Bread	-0.40	-0.38	-0.31	**-0.29**	-1.03	-0.22	-0.29	-0.45	-0.29	-0.96	-3.41	-0.19	-0.68	-1.86
Sugar	-0.25	-0.23	-0.19	-0.18	**-0.63**	-0.14	-0.18	-0.28	-0.18	-0.59	-2.09	-0.12	-0.42	-1.14
Veg. Oil	-0.08	-0.07	-0.06	-0.06	-0.20	**-0.04**	-0.06	-0.09	-0.06	-0.19	-0.66	-0.04	-0.13	-0.36
Marg	-0.11	-0.10	-0.08	-0.08	-0.27	-0.06	**-0.08**	-0.12	-0.08	-0.25	-0.90	-0.05	-0.18	-0.49
Milk	-0.27	-0.25	-0.21	-0.20	-0.69	-0.15	-0.20	**-0.30**	-0.19	-0.65	-2.30	-0.13	-0.46	-1.26
Eggs	-0.54	-0.50	-0.42	-0.39	-1.37	-0.30	-0.39	-0.60	**-0.38**	-1.27	-4.54	-0.26	-0.91	-2.48
Cheese	1.88	1.76	1.46	1.35	4.77	1.04	1.35	2.09	1.33	**4.45**	15.85	0.90	3.18	8.65
Potatoes	-0.01	-0.01	-0.01	-0.01	-0.02	0.00	-0.01	-0.01	-0.01	-0.02	**-0.07**	0.00	-0.01	-0.04
Apple	-1.20	-1.12	-0.93	-0.86	-3.05	-0.66	-0.86	-1.33	-0.85	-2.84	-10.12	**-0.57**	-2.03	-5.53
Orange	-1.30	-1.22	-1.01	-0.93	-3.31	-0.72	-0.93	-1.44	-0.92	-3.08	-10.97	-0.62	**-2.20**	-5.99
Onion	0.23	0.22	0.18	0.17	0.59	0.13	0.17	0.26	0.16	0.55	1.94	0.11	0.39	**1.06**

Source: authors' calculations according to HCSO, 2010

Table 7

Own and cross price elasticities in 2008/2003 for Decile 7.

q \ p	Pork	Beef	Poultry	Bread	Sugar	Veg. Oil	Marg	Milk	Eggs	Cheese	Potatoes	Apple	Orange	Onion
Pork	**0.08**	0.07	0.06	0.06	0.20	0.04	0.06	0.09	0.06	0.19	0.68	0.04	0.14	0.37
Beef	0.00	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poultry	-0.23	-0.22	**-0.18**	-0.17	-0.60	-0.13	-0.17	-0.26	-0.17	-0.55	-1.98	-0.11	-0.40	-1.08
Bread	-0.50	-0.47	-0.39	**-0.36**	-1.28	-0.28	-0.36	-0.56	-0.36	-1.20	-4.26	-0.24	-0.86	-2.33
Sugar	-0.09	-0.08	-0.07	-0.06	**-0.22**	-0.05	-0.06	-0.10	-0.06	-0.20	-0.73	-0.04	-0.15	-0.40
Veg. Oil	-0.05	-0.04	-0.04	-0.03	-0.11	**-0.03**	-0.03	-0.05	-0.03	-0.11	-0.38	-0.02	-0.08	-0.21
Marg	-0.24	-0.22	-0.18	-0.17	-0.61	-0.13	**-0.17**	-0.26	-0.17	-0.56	-2.01	-0.11	-0.40	-1.10
Milk	-0.22	-0.21	-0.17	-0.16	-0.56	-0.12	-0.16	**-0.24**	-0.16	-0.52	-1.85	-0.10	-0.37	-1.01
Eggs	-0.31	-0.29	-0.24	-0.22	-0.78	-0.17	-0.22	-0.34	**-0.22**	-0.73	-2.59	-0.15	-0.52	-1.41
Cheese	1.67	1.56	1.30	1.20	4.25	0.93	1.20	1.86	1.18	**3.96**	14.09	0.80	2.83	7.70
Potatoes	-0.29	-0.27	-0.23	-0.21	-0.74	-0.16	-0.21	-0.32	-0.21	-0.69	**-2.45**	-0.14	-0.49	-1.34
Apple	-0.80	-0.75	-0.62	-0.57	-2.03	-0.44	-0.57	-0.89	-0.56	-1.89	-6.73	**-0.38**	-1.35	-3.68
Orange	-1.14	-1.07	-0.89	-0.82	-2.91	-0.63	-0.82	-1.27	-0.81	-2.71	-9.66	-0.55	**-1.94**	-5.28
Onion	0.14	0.13	0.11	0.10	0.36	0.08	0.10	0.16	0.10	0.34	1.20	0.07	0.24	**0.65**

Source: authors' calculations according to HCSO, 2010

From Tables 6, 7 and 8 mainly negative own price, cross price and income elasticities were observed. The reason for this is that according to the HCSO secondary consumption data almost all examined consumer groups had a decreasing food consumption tendency in 2008 compared to 2003. For example D1 reduced their bread consumption by 17 per cent, and poultry and egg consumption by 22-23 per cent respectively. Sugar consumption was 24 per cent lower for D6 in 2008 than in the base year. D7 decreased their apple consumption by 33 per cent, while the difference was 43 per cent for D10's orange consumption.

Table 8

Income elasticities for D1, D6 and D10 in Hungary

	D1	D6	D10
Pork	-0.33	-0.34	-0.11
Beef	-1.00	-0.20	-0.56
Poultry	-0.76	-0.26	-0.23
Bread	-0.58	-0.68	-0.47
Sugar	-0.36	-0.67	-0.35
Vegetable oil	-0.11	-0.14	-0.08
Margarine	-0.15	-0.44	-0.21
Milk	-0.39	-0.60	-0.30
Eggs	-0.77	-0.33	-0.29
Cheese	2.69	1.90	1.39
Potatoes	-0.01	-0.49	-0.13
Apple	-1.72	-0.88	-0.20
Orange	-1.86	-0.83	-1.30
Onion	0.33	-0.46	0.69

Source: authors' calculations according to HCSO, 2010

Conclusions

The analysis enables us to conclude that all main groups are affected by the price changes. They should be compensated by 0.1-4 per cent of their basic income on the basis of the given consumer basket. The low income groups are the most vulnerable; at least 4 per cent increase in disposable income is necessary for the poorest deciles while only 0.9 per cent is needed for the richest households. This welfare loss seems to be not too high compared to results of 3-6 per cent for Argentina (Porto, 2003), 11.9 per cent for Vietnam (Niimi, 2005) and 73-85 per cent for Indonesia (Friedman and Levinsohn, 2001). The values of the Laspeyres index calculations are also lower in Hungary than in a neighbouring country. In Romania in 2008, the consumer's welfare loss varied between 4 per cent for decile 10 and 12 per cent for decile 1 (Hubbard et al., 2010). Thus we can conclude that the EU accession caused slight changes in Hungarian consumers' welfare if only the above listed 18 food products are considered in the consumer basket, *ceteris paribus*.

Own price elasticities are different for the poor and the middle class groups. The larger elasticities showed that poor consumers are more sensitive to price changes than the gentility. For instance, the price elasticity for pork was -0.23 among the poor and only -0.08 among the middle class. Cross price elasticities were mainly negative for D1 and D7.

Income elasticity of demand is used to see how sensitive the demand for an income changes. It is found that almost all goods are inferior and negative income inelastic. Only onions behaved as a normal good. The observed reduction in food quantities may lead to the assumption that food consumption patterns shifted toward different type of foods such as fast food or pre-prepared meals.

There is no economic model, that explains perfectly an economic situation, but the above method can lead to more accurate results if it is possible to meet the following criteria:

- expanding the consumer basket with more food products that are also often consumed goods (like tomatoes, pasta, mineral water and wine);
- expanding the consumer basket with durable goods, considering food consumption to be constant;
- instead of single-price-change multiple-price-change should be counted, where not the food consumption, neither durable good's consumption is constant;
- choosing an earlier year than 2003 to be the base year could also lead to more reliable results. Although 2003 was the last year before Hungary's EU accession, prior to access, agricultural and food trade were already increasing, so the connection has not reported such a major change. 2003 was even not a good year in agricultural production. Low crop yields due to high prices were observed, and if it is considered the base year, it also might distort the welfare effects of EU accession.
- multivariate logistic regression can be used to assess the effect of food prices on the likelihood of consumption, controlling for socio-demographic variables as well.

Although welfare changes are negligible after the EU accession in the medium-term, a forthcoming study might focus on changes in the long-term. Beside the CAP support programme, more events may occur that bias consumer welfare. Economic recession in 2008, extreme currency exchange rates in 2009 and flood-damaged crop plantations in 2010 could also impact directly on prices and indirectly on consumers. Government policies should broaden the social net in order to compensate the aggrieved consumers.

Acknowledgments

We would like to thank Dr. Carmen Hubbard from the Centre for Rural Economy, School of Agriculture, Food and Rural Development, Newcastle University for her hospitality during the period of this research and for the empirical support she has given for calculating Laspeyres index and Compensating Variation. This study was created in the framework of the OTKA contract K79195.

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